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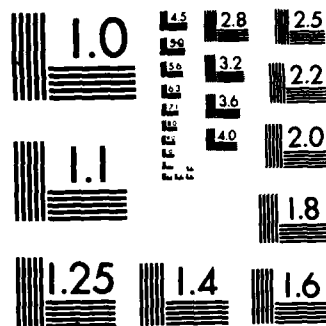
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19. ABSTRACT A Symposium in honor of Professor Roy J. Glauber of Harvard University was held in Cambridge Massachusetts on October 19, 1985, under the joint sponsorship of The US Army Research Office, the Office of Naval Research and Hamamatsu Photonics, KK of Japan. The technical presentations were attended by about 150 participants; the program revolved around 10 invited presentations of about half an hour each from some of the best known scientists in the areas of interest to the Symposium.			
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OCT 2 5 1986

COHERENCE, COOPERATION AND FLUCTUATIONS
A Symposium on
STATISTICAL PHYSICS, QUANTUM OPTICS AND NUCLEAR PHYSICS

In honor of

ROY J. GLAUBER

to be held at the Science Center, Harvard University
Cambridge, Massachusetts
Saturday, October 19, 1985

Program

8:30 Shuttle from Hotel to Science Center and Registration

Quantum Optics I

President: F. Haake

9:00 N. Bloembergen, Harvard University, Cambridge, Mass.
Collisions Induced Coherence

9:30 F.T. Arecchi, Istituto Nazionale di Ottica, Firenze, Italy
Photon Statistics, Coherence and Chaos in Optics

10:00 M.O. Scully, University of New Mexico, Albuquerque, NM
Modern Optical Tests of General Relativity

10:30 Refreshments

Nuclear Physics-High Energy Physics

President: L.M. Narducci

11:00 H. Feshbach, Mass. Institute of Technology, Cambridge, Ma
Some Properties of Propagation in a Strongly Absorbing Medium

11:30 T. Ericson, CERN, Geneva
Diffractive Processes in Multiple Scattering

12 Noon Lunch Break

Quantum Optics II

Presider: **D.F. Walls**

- 2:00 **L. Mandel**, University of Rochester, Rochester, NY
→ Higher Order Squeezing of a Quantum Electromagnetic Field
- 2:30 **S. Haroche**, Ecole Normale Supérieure, Paris
→ Rydberg Atoms in Cavities- Coherence Cooperation and Fluctuations
- 3:00 **R. Pike**, Royal Radar Establishment, Malvern, UK
→ Particle Sizing by Coherent Light Scattering
- 3:30 Refreshments

Statistical Physics

Presider: **H. Pilloff**

- 4:00 **L. Kadanoff**, University of Chicago, Chicago, Ill.
→ Measuring Singularities on a Fractal
- 4:30 **J. Langer**, University of California, Santa Barbara, Ca.
→ Use of Glauber Models for the Study of Systems far from Equilibrium
- 5:15 Shuttle from Science Center to Hotel
- 6:45 Shuttle to Charles Hotel
- 7:00 Cocktails and Banquet
- 9:30 **After Dinner Program**
- M.O. Scully**, University of New Mexico, Albuquerque, NM
Pre-Professorial Glauber or the History of the Man we Love

US Army Research Office
Contract # 22543-PH-CF

**Final Report on the
Symposium on Statistical Physics, Nuclear Physics and
Quantum Optics
in honor of
Roy J. Glauber**

A Symposium in honor of Professor Roy J. Glauber of Harvard University was held in Cambridge Massachusetts on October 19, 1985, under the joint sponsorship of The US Army Research Office, the Office of Naval Research and Hamamatsu Photonics, KK of Japan. The social purpose of the event was to honor the outstanding achievements of Professor Glauber in the areas of Statistical Physics, Nuclear Physics and Quantum Optics; its scientific mission, instead, was to assess the recent progress in these three areas.

With the common trend of scientific conferences being in the direction of ever greater specialization, it is rare that experts from different disciplines can meet and exchange ideas in an informal but stimulating environment. This opportunity was offered during the Glauber Symposium and it was one of its most successful features.

The formal proceedings were preceded on Friday October 18 by a registration/reception period at Harvard University's Science Center, where wine and cheese were served to encourage free and engaging exchanges among the participants, many of whom indeed had not seen each other for a long time. This event was organized with great taste and came through as a great success.

The technical presentations were attended by about 150 participants; the program revolved around 10 invited presentations of about half an hour each from some of the best known scientists

in the areas of interest to the Symposium. After a few welcoming remarks by L.M. Narducci, one of the Conference organizers, the first session of the morning began with a talk entitled "Collision Induced Coherence" by N. Bloembergen, and continued with F.T. Arecchi's "Photon Statistics, Coherence and Chaos in Optics", and with a presentation by M.O. Scully on the topic "Modern Optical Tests of General Relativity". The impact of Roy Glauber to the last twenty years of optics was properly featured by the speakers who, at the same time, gave strong evidence of the current vitality of this field.

At the time of the famous Les Houches Summer School, the birthplace of quantum optics according to most, there was no hint of dynamical chaos, or of the fact that collisions could enhance coherent effects in the interaction of light and matter, or that the measurement of extremely small displacements could be attempted as a way of monitoring the passage of gravitational waves through our corner of the galaxy. Yet, these are some of the remarkable messages that were left with the audience at the end of this session.

After a refreshment break, H. Feshbach opened the Nuclear Physics Session with a survey of new techniques in the theory of scattering, under the title of "Some Properties of Propagation in a Strong Absorbing Medium", and T. Ericson followed with a discussion of "Diffractive Processes in Multiple Scattering". Here also, as in the previous session, Glauber's pioneering impact to the field of scattering theory was well in evidence.

The first meeting of the afternoon brought again optics to the forefront with one of the most popular and exciting new advances: the generation, and perhaps also utilization, of nonclassical states of the electromagnetic field. L. Mandel gave a clear and stimulating address entitled "Higher Order Squeezing of a Quantum Electromagnetic Field". Additional quantum effects of great current interest in the area of Rydberg atom spectroscopy were discussed by S. Haroche in the talk "Rydberg Atoms in Cavities: Coherence, Cooperation and Fluctuations". The macroscopic side of optics was taken up by R. Pike, one of the pioneers of the early days of

Quantum Optics, with a presentation entitled "Particle Sizing by Coherent Light Scattering". His talk reminded us that we are now in possession of powerful diagnostic tools for the analysis of wind speed, the mapping of blood flow in the veins and arteries, and the measurement of particle size distributions and that these devices are the direct outgrowth of theoretical developments and laboratory tests performed two decades ago.

The final session of the day, devoted to Statistical Physics, was opened by L. Kadanoff with an entertaining and profound discussion by the title "Measuring Singularities on a Fractal", which was followed by J. Langer's "Use of Glauber Models for the Study of Systems far from Equilibrium".

After a brief interlude, a large number of attendees reconvened at the Charles Hotel in Cambridge for cocktails, a banquet and a delightful talk and slide show by M.O. Scully on the early exploits of a child prodigy who was to become one of the most influential personalities in modern physics. The after-dinner speech "Pre-Professorial Glauber or the History of the Man we Love" was one of the highlights of the day.

All the major aspects of this event went flawlessly. Transportations were provided for the attendees to and from the designated headquarter hotel, the lecture hall was comfortable and had excellent acoustics and lighting, and the refreshments were excellent, at least judging from the speed at which they disappeared. A nonnegligible side benefit for those people that could afford to stay in Boston one more day was the running of the world famous Charles Regatta under gloriously blue skies.

The Conference was organized by F. Haake, L.M. Narducci and D. Walls who, at various times during the mid to late 1960's, enjoyed the benefit of Professor Glauber's teaching and advice. One of the durable benefits of the Glauber Symposium will be a proceedings volume containing nine of the invited talks and a large number of shorter contributions from numerous friends and colleagues of Professor Glauber's, who chose to mark this occasion with a scientific tribute. In addition the book will display four of

Glauber's most important contributions from all three areas covered by the conference. At this writing, the book is about to be distributed by the publisher, Cambridge University Press. Copies of the book, as requested by the Contract, will be furnished to the US Army Research Office.

Copies of the announcement and of the program are enclosed with this report.

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Philadelphia, Pa. 19104

Professor D. Walls
Physics Department
University of
Waikato, Hamilton
New Zealand

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An Invitation to attend

* COHERENCE, COOPERATION AND FLUCTUATIONS *

A symposium on
STATISTICAL PHYSICS, QUANTUM OPTICS AND NUCLEAR PHYSICS
in honor of

* ROY J. GLAUBER *

to be held at Harvard University
Cambridge, Massachusetts

Saturday, October 19, 1985

Jointly sponsored by:
the Office of Naval Research
U.S. Army Research Office
Hamamatsu Photonics, KK, Japan

A symposium on Statistical Physics, Quantum Optics and Nuclear Physics will be held at Harvard University, in Cambridge Massachusetts on October 19, 1985.

The main purpose of this meeting is to bring together experts from these three large areas of modern physics, to assess the status of our progress over the last 20 years of research and to project our prospects for future advances.

The occasion for the Conference is provided by the 60th birthday of Professor Roy J. Glauber. In his work that spans the last three decades, Professor Glauber has made significant pioneering contributions to statistical physics, quantum optics and nuclear physics. The kinetic Ising model, the concepts of geometric optics in high-energy collisions and the quantum mechanical notion of coherence of radiation are examples of his contributions which have helped the development of large bodies of research. Therefore, research activities in these areas will be of special interest for this meeting.

The topics to be covered include:

- ★ Coherence and higher-order correlations in quantum optics
- ★ Electromagnetic scattering
- ★ High energy scattering
- ★ Phase transitions in the kinetic Ising model
- ★ Systems far from equilibrium
- ★ Deterministic chaos

Technical information will be exchanged through the oral presentations of a selected panel of researchers and the written submission of articles to be published in a Proceedings Volume.

This Symposium intends to emphasize the existence of unifying features and common techniques in selected physical phenomena from these broad fields of research. In all these areas, the notions of coherence, cooperation and fluctuations, have played a central role at arriving at our current level of understanding. The usefulness of these concepts to other areas of physics will be emphasized.

REGISTRATION AND ACCOMODATIONS

The meeting will be held on the Campus of Harvard University in Cambridge, Massachusetts. As an aid to the organization of the conference, the attendees are kindly requested to fill out the enclosed preregistration form and mail it along to Lorenzo M. Narducci (address listed below).

A fee of \$35 is requested at the time of registration. Payment by check (payable to *THE GLAUBER SYMPOSIUM*) can also be mailed with the preregistration form. This fee will be applied to cover the cost of the program, refreshments, and the evening banquet, in addition several other charges related to the use of the University's facilities.

The registration desk will be open between the hours of 6:00 and 9:00 PM on Friday evening, October 18th in the Science Center. During this time, an informal wine and cheese reception will also be held in the registration area. Saturday morning, the day of the conference, the registration desk will be open between 8:00 and 10:00 AM.

A block of rooms at the special conference rate of \$62 for single rooms has been reserved for the attendees at the Howard Johnson's Hotel (listed below) for the night of October 18, 1985. Rooms will be held until 6:00 PM of the arrival day, unless guaranteed. Cancellations are accepted by 4:00 PM of the arrival day at no penalty. Attendees are requested to make their own reservations by mentioning the Glauber Symposium to obtain the reduced rates. Alternative accomodations in other nearby hotels are also available. Further information can be obtained from L.M. Narducci regarding any of these details.

BANQUET

A banquet will be held on the University Campus at a location yet to be announced. The banquet will be preceeded by a cocktail hour beginning at 7:00 PM, Saturday, October 19, 1985. The cost of the banquet, cocktails, and rental of the University Facilities are covered by the registration fees.

CONFERENCE ORGANIZERS

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Universitat Essen, GHS
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FED. REP. OF GERMANY

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HOTEL ACCOMODATIONS

HOWARD JOHNSON'S HOTEL
777 Memorial Drive
Cambridge, MA 02139
(617) 492-7777

INVITED PAPERS

Invited presentations have been solicited from well-known scientists working in the general areas of interest to this meeting. The following speakers have agreed to address this conference.

F.T. ARECCHI	Istituto Nazionale di Ottica; Firenze, Italy
N. BLOEMBERGEN	Harvard University, Cambridge, MA
T.E.O. ERICSON	CERN, Geneva, Switzerland
H. FESHBACH	MIT, Cambridge, MA
S. HAROCHE	University of Paris; Paris, France
L. KADANOFF	University of Chicago; Chicago, IL
J. LANGER	University of California; Santa Barbara, CA
L. MANDEL	University of Rochester; Rochester, NY
R. PIKE	Royal Radar Establishment; Malvern, UK
M. SCULLY	University of New Mexico; Albuquerque, NM

PREPARATION OF WRITTEN CONTRIBUTIONS

The Conference Organizers have made arrangements to assemble a Proceedings Volume containing contributions from the invited speakers and presentations from numerous other experts in the areas of interest to this symposium. The papers will be prepared on camera-ready forms to expedite the printing process and will be typed uniformly by the Conference Organizers. The authors are requested to prepare their contributions following essentially the same format as with regular journal submissions.

However, there are specific instructions that are to be followed. These will be mailed to all invited speakers and to all other authors who have indicated their interest in submitting a contribution. These instructions represent an essential guide in the preparation of the manuscripts because of specific guidelines that the publisher wishes to enforce, especially with regard to references, footnotes, figures and illustrations.

SUBMISSION OF PAPERS

The manuscript and accompanying illustrations should be forwarded to the Conference Organizers *NO LATER THAN OCTOBER 19, 1985*. Prospective authors of contributed papers are kindly requested to notify Fritz Haake or Lorenzo M. Narducci about their interest in submitting a manuscript *BEFORE AUGUST 1, 1985*. They will then receive a copy of the instructions for preparation of their paper. Notification that the contributed manuscripts have been accepted for the Proceedings Volume will be made on or about *NOVEMBER 30, 1985*.

END

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